

## PATENT COOPERATION TREATY

PCT

## NOTIFICATION OF ELECTION

(PCT Rule 61.2)

From the INTERNATIONAL BUREAU

To:

Assistant Commissioner for Patents  
United States Patent and Trademark  
Office  
Box PCT  
Washington, D.C.20231  
ÉTATS-UNIS D'AMÉRIQUE

in its capacity as elected Office

Date of mailing: 23 December 1999 (23.12.99)	
International application No.: PCT/JP99/03124	Applicant's or agent's file reference: P20815-PO
International filing date: 10 June 1999 (10.06.99)	Priority date: 15 June 1998 (15.06.98)
Applicant: HATOH, Kazuhito et al	

1. The designated Office is hereby notified of its election made:

☒ in the demand filed with the International preliminary Examining Authority on:  
08 November 1999 (08.11.99)☐ in a notice effecting later election filed with the International Bureau on:  
\_\_\_\_\_2. The election ☒ was☐ was not

made before the expiration of 19 months from the priority date or, where Rule 32 applies, within the time limit under Rule 32.2(b).

The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland Facsimile No.: (41-22) 740.14.35	Authorized officer:  J. Zahra Telephone No.: (41-22) 338.83.38
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(51) 国際特許分類 H01M 8/24	A1	(11) 国際公開番号 WO99/66580  (43) 国際公開日 1999年12月23日(23.12.99)
<p>(21) 国際出願番号 PCT/JP99/03124</p> <p>(22) 国際出願日 1999年6月10日(10.06.99)</p> <p>(30) 優先権データ 特願平10/166636 1998年6月15日(15.06.98) JP</p> <p>(71) 出願人 (米国を除くすべての指定国について) 松下電器産業株式会社 (MATSUSHITA ELECTRIC INDUSTRIAL CO., LTD.)(JP/JP) 〒571-8501 大阪府門真市大字門真1006番地 Osaka, (JP)</p> <p>(72) 発明者 ; および</p> <p>(75) 発明者 / 出願人 (米国についてのみ) 羽藤一仁(HATOH, Kazuhito)(JP/JP) 〒574-0076 大阪府大東市曙町6番 往道パークハイツ714号 Osaka, (JP) 安本栄一(YASUMOTO, Eiichi)(JP/JP) 〒576-0021 大阪府交野市妙見坂5-8-104 Osaka, (JP) 西田和史(NISHIDA, Kazufumi)(JP/JP) 〒570-0016 大阪府守口市大日東町18-4 ハイツ西口202 Osaka, (JP)</p>	<p>行天久朗(GYOTEN, Hisaaki)(JP/JP) 〒575-0013 大阪府四條畷市田原台3-10-2 Osaka, (JP)</p> <p>(74) 代理人 弁理士 石井和郎(ISHII, Kazuo) 〒541-0041 大阪府大阪市中央区北浜2丁目3番6号 北浜山本ビル Osaka, (JP)</p> <p>(81) 指定国 CN, US, 欧州特許 (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE)</p> <p>添付公開書類 国際調査報告書</p>	
<p>(54)Title: <u>HIGH POLYMER ELECTROLYTE FUEL CELL</u></p> <p>(54)発明の名称 高分子電解質型燃料電池</p> <p>(57) Abstract</p> <p>A high polymer electrolyte fuel cell comprising, laminated one upon another, a single cell, a collector plate, an insulating plate and end plates, the single cell being provided with a high polymer electrolytic membrane, a cathode and an anode having catalyst reaction layers and sandwiching the high polymer electrolytic membrane therebetween, a separator having a means for supplying a hydrogen-containing fuel gas to the anode and a separator having a means for supplying an oxydizing agent gas to the cathode, wherein a total heat exchanger for transferring heat and moisture simultaneously from an exhausted gas to the fuel gas and the oxydizing agent gas is built in on the inner sides of the end plates provided at the opposite ends of the fuel cell or between the insulating plate and the collector plate or the end plates, thereby making it possible to efficiently utilize after-use cooling water and to provide the high polymer electrolyte fuel cell having a compact internal total heat exchanger.</p>		

## PATENT COOPERATION TREATY

## PCT

## INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference P20815-PO	<b>FOR FURTHER ACTION</b> See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
International application No. PCT/JP99/03124	International filing date (day/month/year) 10 June 1999 (10.06.99)	Priority date (day/month/year) 15 June 1998 (15.06.98)
International Patent Classification (IPC) or national classification and IPC H01M 8/24		
Applicant MATSUSHITA ELECTRIC INDUSTRIAL CO., LTD.		

<p>1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.</p> <p>2. This REPORT consists of a total of <u>3</u> sheets, including this cover sheet.</p> <p><input checked="" type="checkbox"/> This report is also accompanied by ANNEXES, i.e., sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).</p> <p>These annexes consist of a total of <u>1</u> sheets.</p>	
<p>3. This report contains indications relating to the following items:</p> <p>I <input checked="" type="checkbox"/> Basis of the report</p> <p>II <input type="checkbox"/> Priority</p> <p>III <input type="checkbox"/> Non-establishment of opinion with regard to novelty, inventive step and industrial applicability</p> <p>IV <input type="checkbox"/> Lack of unity of invention</p> <p>V <input checked="" type="checkbox"/> Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement</p> <p>VI <input type="checkbox"/> Certain documents cited</p> <p>VII <input type="checkbox"/> Certain defects in the international application</p> <p>VIII <input type="checkbox"/> Certain observations on the international application</p>	

Date of submission of the demand 08 November 1999 (08.11.99)	Date of completion of this report 10 July 2000 (10.07.2000)
Name and mailing address of the IPEA/JP	Authorized officer
Facsimile No.	Telephone No.

## INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.

PCT/JP99/03124

## I. Basis of the report

## 1. With regard to the elements of the international application:\*

- ☐ the international application as originally filed
- ☒ the description:  
pages 1-12, as originally filed  
pages \_\_\_\_\_, filed with the demand  
pages \_\_\_\_\_, filed with the letter of \_\_\_\_\_
- ☒ the claims:  
pages \_\_\_\_\_, as originally filed  
pages \_\_\_\_\_, as amended (together with any statement under Article 19  
pages \_\_\_\_\_, filed with the demand  
pages 1, filed with the letter of 30 March 2000 (30.03.2000)
- ☐ the drawings:  
pages \_\_\_\_\_, as originally filed  
pages \_\_\_\_\_, filed with the demand  
pages \_\_\_\_\_, filed with the letter of \_\_\_\_\_
- ☐ the sequence listing part of the description:  
pages \_\_\_\_\_, as originally filed  
pages \_\_\_\_\_, filed with the demand  
pages \_\_\_\_\_, filed with the letter of \_\_\_\_\_

## 2. With regard to the language, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language \_\_\_\_\_ which is:

- ☐ the language of a translation furnished for the purposes of international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of the translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

## 3. With regard to any nucleotide and/or amino acid sequence disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. ☒ The amendments have resulted in the cancellation of:

- ☐ the description, pages \_\_\_\_\_
- ☒ the claims, Nos. 2-3
- ☐ the drawings, sheets/fig \_\_\_\_\_

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).\*\*

\* Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rule 70.16 and 70.17).

\*\* Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.

# INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.

PCT/JP99/03124

## V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

### 1. Statement

Novelty (N)	Claims	1	YES
	Claims		NO
Inventive step (IS)	Claims		YES
	Claims	1	NO
Industrial applicability (IA)	Claims	1	YES
	Claims		NO

### 2. Citations and explanations

The reaction gas humidifier described in document 1 [JP, 6-132038, A (Fuji Electric Co., Ltd.), 13 May, 1994 (13.05.94) (Family: none)] cited in the ISR corresponds to the total heat exchanger described in claim 1. So, the subject matter of claim 1 is different from document 1, in the following:

- (1) A total heat exchanger is contained inside the end plates arranged at both ends of a high polymer electrolyte fuel cell, or between an insulating plate and a collector plate or the end plates; and
- (2) Total heat exchange is executed through a 25 $\mu$  or thinner membrane of the same high polymer electrolytic membrane as the high polymer electrolyte used in a single cell.

However, with regard to the above (1), the internal installation of a reaction gas humidifier between the plates arranged at the ends of a high polymer electrolyte fuel cell is well known as described in document 2 [JP, 9-204924, A (Tanaka Kikinzoku Kogyo K.K.), 5 August, 1997 (05.08.97), Fig. 10 (Family: none)] cited in the ISR or newly cited document 3 [WO, 95-25357, A (Ballard Power Systems Inc.), 21 September 1995 (21.09.95) (Family: none)]. In addition, since document 3 also describes the supply of the exhaust gas of a fuel cell to a reaction gas humidifier, it could have been easily conceived by a person skilled in the art, to arrange the total heat exchanger described in document 1 inside the end plates, or between the insulating plate and the collector plate or the end plates.

Furthermore, with regard to the above (2), as described in document 2 or document 4 [JP, 9-213359, A (Matsushita Electric Industrial Co., Ltd.), 15 August, 1997 (15.08.97) (Family: none)], it is well known to humidify a reaction gas using the same high polymer electrolytic membrane as the high polymer electrolyte used in a single cell, and in addition, document 4 (column 0017) also describes that a thin ion exchange membrane is likely to diffuse water. So, it is a mere matter of design variation that can be decided as required by a person skilled in the art, to use a 25 $\mu$  or thinner high polymer electrolytic membrane as the water vapor permeable membrane used in the total heat exchanger described in document 1.

E P



P C T

## 国際調査報告

(法8条、法施行規則第40、41条)  
[PCT18条、PCT規則43、44]

出願人又は代理人 の書類記号 P 2 0 8 1 5 - P O	今後の手続きについては、国際調査報告の送付通知様式(PCT/ISA/220)及び下記5を参照すること。	
国際出願番号 PCT/J P 9 9 / 0 3 1 2 4	国際出願日 (日.月.年) 1 0 . 0 6 . 9 9	優先日 (日.月.年) 1 5 . 0 6 . 9 8
出願人(氏名又は名称) 松下電器産業株式会社		

国際調査機関が作成したこの国際調査報告を法施行規則第41条(PCT18条)の規定に従い出願人に送付する。  
この写しは国際事務局にも送付される。

この国際調査報告は、全部で 3 ページである。

☐ この調査報告に引用された先行技術文献の写しも添付されている。

## 1. 国際調査報告の基礎

a. 言語は、下記に示す場合を除くほか、この国際出願がされたものに基づき国際調査を行った。

☐ この国際調査機関に提出された国際出願の翻訳文に基づき国際調査を行った。

b. この国際出願は、ヌクレオチド又はアミノ酸配列を含んでおり、次の配列表に基づき国際調査を行った。

☐ この国際出願に含まれる書面による配列表

☐ この国際出願と共に提出されたフレキシブルディスクによる配列表

☐ 出願後に、この国際調査機関に提出された書面による配列表

☐ 出願後に、この国際調査機関に提出されたフレキシブルディスクによる配列表

☐ 出願後に提出した書面による配列表が出願時における国際出願の開示の範囲を超える事項を含まない旨の陳述書の提出があった。

☐ 書面による配列表に記載した配列とフレキシブルディスクによる配列表に記録した配列が同一である旨の陳述書の提出があった。

2. ☐ 請求の範囲の一部の調査ができない(第I欄参照)。

3. ☐ 発明の単一性が欠如している(第II欄参照)。

4. 発明の名称は ☒ 出願人が提出したものを承認する。

☐ 次に示すように国際調査機関が作成した。

5. 要約は ☒ 出願人が提出したものを承認する。

☐ 第III欄に示されているように、法施行規則第47条(PCT規則38.2(b))の規定により国際調査機関が作成した。出願人は、この国際調査報告の発送の日から1カ月以内にこの国際調査機関に意見を提出することができる。

6. 要約書とともに公表される図は、

第 \_\_\_\_\_ 図とする。 ☐ 出願人が示したとおりである。

☒ なし

☐ 出願人は図を示さなかった。

☐ 本図は発明の特徴を一層よく表している。

## A. 発明の属する分野の分類 (国際特許分類 (IPC))

Int. C1° H01M8/24

## B. 調査を行った分野

## 調査を行った最小限資料 (国際特許分類 (IPC))

Int. C1° H01M8/00-8/24

最小限資料以外の資料で調査を行った分野に含まれるもの

日本国実用新案公報 1926-1996

日本国公開実用新案公報 1971-1999

日本国登録実用新案公報 1994-1999

日本国実用新案登録公報 1996-1999

国際調査で使用した電子データベース (データベースの名称、調査に使用した用語)

WPI/L

## C. 関連すると認められる文献

引用文献の カテゴリー*	引用文献名 及び一部の箇所が関連するときは、その関連する箇所の表示	関連する 請求の範囲の番号
Y	J P, 6-132038, A (富士電機株式会社), 13. 5月. 1994 (13. 05. 94), 特許請求の範囲【請求項1】- 【請求項3】、【0015】、第1図 (ファミリーなし)	1-3
Y	J P, 9-204924, A (田中貴金属工業株式会社) 05. 8 月. 1997 (05. 08. 97), 【0016】、第10図 (フ ァミリーなし)	1-3
Y A	J P, 9-213359, A (松下電器産業株式会社), 15. 8 月. 1997 (15. 08. 97), 【0011】、【0017】 13-14図& EP, 788172, A	3 1-2

☒ C欄の続きにも文献が列挙されている。☐ パテントファミリーに関する別紙を参照。

## \* 引用文献のカテゴリー

「A」 特に関連のある文献ではなく、一般的技術水準を示すもの

「E」 国際出願日前の出願または特許であるが、国際出願日以後に公表されたもの

「L」 優先権主張に疑義を提起する文献又は他の文献の発行日若しくは他の特別な理由を確立するために引用する文献 (理由を付す)

「O」 口頭による開示、使用、展示等に言及する文献

「P」 国際出願日前で、かつ優先権の主張の基礎となる出願

の日の後に公表された文献

「T」 国際出願日又は優先日後に公表された文献であって出願と矛盾するものではなく、発明の原理又は理論の理解のために引用するもの

「X」 特に関連のある文献であって、当該文献のみで発明の新規性又は進歩性がないと考えられるもの

「Y」 特に関連のある文献であって、当該文献と他の1以上の文献との、当業者にとって自明である組合せによって進歩性がないと考えられるもの

「&amp;」 同一パテントファミリー文献

国際調査を完了した日

07. 09. 99

国際調査報告の発送日

28.09.99

国際調査機関の名称及びあて先

日本国特許庁 (ISA/J P)

郵便番号100-8915

東京都千代田区霞が関三丁目4番3号

特許庁審査官 (権限のある職員)

榊原 貴子



4 X

9 4 4 4

電話番号 03-3581-1101 内線 3435

C (続き) . 関連すると認められる文献		
引用文献の カテゴリー*	引用文献名 及び一部の箇所が関連するときは、その関連する箇所の表示	関連する 請求の範囲の番号
A	J P, 7-176313, A (三菱重工業株式会社), 14. 7 月. 1995 (14. 07. 95), 特許請求の範囲【請求項 1】、第1図 (ファミリーなし)	1-3



09/719526  
526 Rec'd PCT/PTO 13 DEC 2000

**AMENDMENT**  
(under Article 34)  
(Translation)

To : Commissioner of the Patent Office

1 Identification of the International Application  
PCT/JP99/03124

2 Applicant

Name : Matsushita Electric Industrial Co., Ltd.

Address : 1006, Oaza-Kadoma, Kadoma-shi, Osaka-fu,  
571-8501 JAPAN

Country of nationality : Japan

Country of residence : Japan

3 Agent

Name : (7243) Patent Attorney, ISHII Kazuo ( seal )

Address : Kitahama-Yamamoto Building, 3-6,  
Kitahama 2-chome, Chuo-ku, Osaka-shi,  
Osaka 541-0041 Japan

4 Item to be Amended Claims

5 Subject Matter of Amendment

As per the attached sheets, where claims 2 and 3 are  
canceled.

6 List of Attached Documents

(1) Claims, Page 15

CLAIMS

1. A polymer electrolyte fuel cell comprising a unit cell composed of a polymer electrolyte membrane, a cathode and an anode each having a catalyst reaction layer and disposed across said polymer electrolyte, a separator having a means for supplying a fuel gas to said anode, a separator having a means for supplying an oxidant gas to said cathode, a current collector plate, an insulating plate and an end plate laminated,

said fuel cell further comprising a total heat exchanger for concurrently moving heat and humidity from an discharged gas toward said fuel gas and oxidant gas being installed inside the end plates disposed on both ends of said polymer electrolyte fuel cell, or between said insulating plate and either said current collector plate or said end plate.

2. The polymer electrolyte fuel cell in accordance with claim 1, wherein said total heat exchange is effected between the fuel gas supplied to said cathode and the gas discharged from said cathode.

3. The polymer electrolyte fuel cell in accordance with claim 1, wherein said total heat exchange is effected via a polymer electrolyte membrane having a thickness of 25 $\mu$ m or less.